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(21) International Application Number: PCT/GB82/00326 (22) International Filing Date: 15 November 1982 (15.11.82) (31) Priority Application Number: 8212514 (32) Priority Date: 29 April 1982 (29.04.82) (33) Priority Country: GB (71) Applicant (for all designated States except US): DARYL INDUSTRIES LIMITED [GB/GB]; Alfred Road, Wallasey, Merseyside L44 7HY (GB). (72) Inventor; and (75) Inventor/Applicant (for US only) : BERNSTEIN, Melville, Sydney [GB/GB]; 38 Sea Road, Wallasey, Merseyside L44 7YH (GB). (74) Agent: THOMSON, Paul, Anthony; Potts, Kerr & Co., 15 Hamilton Square, Birkenhead, Merseyside L41 6BR (GB).		(81) Designated States: AT (European patent), AU, BE (European patent), CH (European patent), DE (European patent), FR (European patent), GB (European patent), JP, LU (European patent), NL (European patent), SE (European patent), US. Published <i>With international search report.</i>
(54) Title: LAMINATED BODY (57) Abstract A laminated body comprises a substrate, particularly a glass sheet, having at least one pre-printed polyester film bonded to a surface of said substrate. In a particular embodiment the utilisation of a pre-printed polyester film enables plain glass to be utilised instead of figured glass since the bonding of the pre-printed polyester film to the glass sheet ensures that the plain glass complies with safety glass requirements. The provision of printing on the polyester film enables various patterns or pictures to be applied to the glass sheet as well as masking any undesired marks which may occur when bonding the pre-printed polyester film to the glass sheet.		

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LAMINATED BODY

The present invention relates to a laminated body, and is particularly concerned with the bonding of a polyester film to a glass sheet.

5 In the case of glass sheets used for shower screens and the like it is desired that such glass sheets should comply with official regulations and standards in relation to safety glass. A procedure which has been adopted in this regard is to bond a polyester film to one or both sides of the glass
10 sheet. Such arrangement provides that, should the glass sheet be accidentally broken, then jagged pieces of glass will not fall away from the glass sheet, since the bonded polyester film holds the broken glass sheet in place.

15 In producing such safety glass, it is extremely difficult to arrange for bonding of a polyester film to a sheet of glass. One is concerned with bonding two impermeable surfaces together which can prove to be extremely difficult. A polyester film is utilised since same is a biaxially orientated film
20 and thus enables the film to have pressure applied thereto in both the longitudinal direction of the film as well as the transverse direction. It is believed that other plastics material films are not biaxially orientated and such would not be suitable for bonding to a glass sheet.

25 Bonding is effected utilising a suitable pressure-sensitive adhesive which is coated on one side of the polyester film. The adhesive may comprise an emulsion-or solvent-based acrylic resin whereby the solvent is removed by heat since the polyester film is insensitive to the temperature involved.
30

Many problems have been associated in bonding a polyester film to a glass sheet and various apparatus have been devised



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in an attempt to provide suitable bonding. When applying an adhesively coated polyester film to a glass sheet it is extremely difficult to avoid dust collecting or air bubbles forming between the polyester film and the glass sheet. The marking caused by such dust and air bubbles would show through if the glass sheet were plain. Accordingly, it has been found necessary to utilise figured or patterned glass sheets so that the pattern appearing thereon disguises the marking caused by the dust and/or air bubbles or the like. The generally non-uniform nature of the patterning effectively masks the undesired marks.

Such safety glass comprising a figured glass sheet having a polyester film bonded to the non-figured side of the glass sheet has proved to be very popular as well as being very safe. However, no procedure has heretofore been available enabling plain glass sheets to be machine applied. It is thus an embodiment of the invention to provide a laminated body utilising plain glass sheets.

According to the present invention there is provided a laminated body comprising a substrate having at least one pre-printed polyester film bonded to a surface of said substrate.

Preferably, the printing appears on the side of the film which is bonded to the substrate.

If desired, a plurality of differently pre-printed polyester films are bonded to the surface of the substrate, in order to build up a picture or pattern.

Furthermore, the pre-printed polyester film can be applied to one or both side surfaces of the substrate.



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Whilst the present invention has many applications whereby the pre-printed polyester film is bonded to a surface of a substrate, the surface in question depending upon the intended use, the following detailed description will be given in the case where such substrate is a glass sheet.

By utilising a pre-printed polyester film it is possible to utilise plain glass instead of figured glass, which will produce a considerable saving in costs, whilst at the same time ensuring that such plain glass complies with safety glass requirements.

It is, of course, still possible to utilise the pre-printed polyester film with figured glass since the printing in such case could be by way of a particular colour printing whereby a desired tinting of the glass could be achieved. Previously it has been necessary to subject the glass to a tinting process which has proved extremely costly. The embodiment referred to above, would make it possible to utilise normal white glass, the tinting thereby being produced by printing or dyeing of polyester film.

In addition to its use in shower screens, it is also envisaged that laminated or organically coated glass sheets in accordance with the invention could be utilised in homes, offices and public buildings. For example, if it is desired to replace a wooden door by a glass door then instead of the patterned glass used at the present time, which is not safety glass, one could use a plain glass sheet having a pre-printed polyester film bonded to a surface thereof. Thus, at the same time as rendering such plain glass "safe", it is also possible to make such glass attractive and ornamental. It would also be possible to utilise the device of the present invention in any situation where glass sheets are utilised. For example, in the entrance to a shop or an office where printing is normally applied to the glass surface, the



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arrangement of the present invention can be utilised with the polyester film containing the printing which was previously on the glass.

5 In practice, a roll of polyester film would have a desired pattern or marking printed thereon on one side of such film. A compatible pressure-sensitive adhesive would then be applied over the printing and the pre-printed film would then be bonded to a glass sheet. It will thus be seen that the
10 printing would be sandwiched between the glass sheet and the polyester film and therefore would be unlikely to be marked by scratching or the like since the polyester film is extremely strong. Heretofore, printing on a glass surface has only been
15 successful for a limited period of time due to the effect of marking of the printing taking place.

It can thus be seen that numerous opportunities arise for use of an organically coated glass sheet in accordance with the present invention, with the added bonus that the glass
20 utilised becomes safety glass. It will be appreciated that the laminated body in accordance with the invention can be of any desired shape or thickness depending upon its intended use. Whilst it is applicable to both figured and plain glass, it is also possible to use with mirrored glass.

25 It will thus be seen that the laminated body of the present invention provides a means whereby glass sheets are made into safety glass whilst at the same time having printing sandwiched between the polyester film and the glass. The
30 provision of the printing, particularly if it is irregular, effectively masks any marks which may appear between the polyester film and the glass sheet.

As previously mentioned, the laminated body of the present
35 invention has many uses and one can bond the pre-printed



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polyester film to any desired surface, e.g. wood, plastics sheet, sheet metal or the like. In the case of sheet metal for example the poly-printed polyester film would be of ornamental use.

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Claims:

1. A laminated body comprising a substrate having at least one pre-printed polyester film bonded to a surface of said substrate.

5 2. A laminated body as claimed in claim 1, in which the printing appears on the side of the film which is bonded to the substrate.

10 3. A laminated body as claimed in claim 1 or 2, in which a plurality of differently pre-printed polyester films are bonded to the surface of the substrate in order to build up a picture or pattern.

15 4. A laminated body as claimed in any preceding claim, in which the pre-printed polyester film is applied to both side surfaces of the substrate.

20 5. A laminated body as claimed in any preceding claim, in which the substrate is a glass sheet.

6. A laminated body as claimed in claim 5, in which the glass sheet is a plain glass sheet.

25 7. A laminated body as claimed in claim 5, in which the glass sheet is a figured or patterned glass sheet.

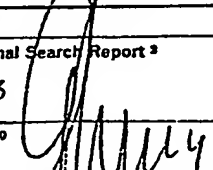
8. A laminated body as claimed in any preceding claim, substantially as hereinbefore described.

30 9. A method of producing a laminated body as claimed in any preceding claim comprising printing a desired pattern or marking on one side of a roll of polyester film, applying a compatible pressure-sensitive adhesive over the printing and thereafter bonding the pre-printed film to a glass sheet.



INTERNATIONAL SEARCH REPORT

International Application No **PCT/GB 82/00326**

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ³		
According to International Patent Classification (IPC) or to both National Classification and IPC IPC³: B 44 F 1/06; B 44 C 1/10; B 32 B 17/10		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁴		
Classification System	Classification Symbols	
IPC³	B 32 B; B 44 F	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁵		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴		
Category ⁶	Citation of Document, ¹⁵ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸
X	FR, A, 2409868 (L. BENOIT) 22 June 1979, see the entire document --	1,2,5,6,8,9
X	FR, A, 2380879 (STAUFFER CHEMICAL CORP.) 15 September 1978, see page 1, line 33 - page 2, line 10; page 3, line 1 - page 5, line 15; claims --	1,3,8
X	FR, A, 2285976 (ERNST M.) 23 April 1976, see the entire document --	1,2,5,6,8,9
A	FR, A, 1485713 (B. CADOR) 23 June 1967 see pages 1 and 2 --	1
A	GB, A, 1069503 (E.L. STEIN) 17 May 1967, see page 1, line 29 - page 2, line 9 --	1,7
A	FR, A, 1405838 (M. LEVY) 8 June 1965, see the entire document --	1,2
A	US, A, 3516893 (A.J. GERARD) 23 June 1970, see abstract; column 1, lines 33-36; column 2, lines 16-42; figure ./. --	1,2,5,6
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>¹⁹ * Special categories of cited documents: ¹⁵</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"Δ" document member of the same patent family</p> </div> </div>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search ²		Date of Mailing of this International Search Report ²
9th March 1983		25th March 1983
International Searching Authority ¹		Signature of Authorized Officer ²⁰
EUROPEAN PATENT OFFICE		 G.L.M. Kruidenberg

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, ^{1*} with indication, where appropriate, of the relevant passages ^{2*}	Relevant to Claim No ^{1*}
A	FR, A, 1201683 (E.J. LEROUX) 15 July 1959, see page 1, left-hand column, lines 9-13 ---	1
A	DE, C, 833902 (H. ROST & CO.) 31 August 1950 ---	
A	DE, A, 1965347 (H. ROCKMAN) 10 September 1970 -----	